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ABSTRACT

This brochure is part of NAEPFACTS, a new series that briefly summarizes findings from the National Assessment of Educational Progress (NAEP). Course-taking is generally a powerful indicator of mathematics achievement. This occurs partially because students who are more proficient tend to take more mathematics classes and, at the eighth grade, the better students are tracked into more advanced classes. The 1992 NAEP results linking proficiency to course work confirm this pattern, with eighth graders enrolled in pre-algebra and algebra courses having higher proficiency scores than students taking eighth-grade mathematics. Contains two tables for 1992: (1) National average proficiency of public and private school eighth-grade students by mathematics course-taking, and by race and gender and (2) Average proficiency of eighth-grade public school students by mathematics course-taking, and by state. (MKR)

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NAEPFACTS

Vol. 1, No. 2 February 1996

Eighth-Grade Algebra Course-Taking and Mathematics Proficiency

Data from the 1992 National Assessment of Educational Progress (NAEP) in mathematics for the nation and the states provided insights into potential relationships between mathematics-related curriculum and instructional activities, and student achievement.

Course-taking is generally a powerful indicator of mathematics achievement. This occurs partially because students who are more proficient tend to take more mathematics classes and, at the eighth grade, the better students are tracked into more advanced classes. The 1992 NAEP results linking proficiency to course work confirm this pattern, with eighth graders enrolled in pre-algebra and algebra courses having higher proficiency scores than students taking eighth-grade mathematics.

The information concerning course work was provided by a background questionnaire, which was included in the 1992 NAEP Mathematics Assessment. The background questionnaire asked students: *What kind of mathematics class are you taking this year?*

A) I am not taking mathematics this year.
B) Eighth-grade mathematics
C) Pre-algebra
D) Algebra
E) Other mathematics class

At the national level and, interestingly, at every state and jurisdiction that participated in the 1992 NAEP assessment, eighth graders who were enrolled in algebra courses had consistently higher average proficiencies than students enrolled in pre-algebra, who in turn had higher proficiencies than students taking general eighth-grade mathematics courses (tables 1 and 2).

Substantially larger proportions of white and Asian/Pacific Islander students were taking algebra than black and Hispanic students. Similarly, larger proportions of students in advantaged urban areas and private schools were taking algebra in eighth grade.

The National Council of Teachers of Mathematics has emphasized the need for *all* students at the eighth grade to be taught a wide range of mathematical topics including estimation, functions, statistics, probability, measurement, and algebra.

For students to learn important mathematical concepts at the high school level, they must have the needed foundation in mathematics at the middle school level. Algebra seems to be the gateway toward improved mathematical learning at the secondary level. (Another NCES publication offers a longitudinal perspective on this topic: *Mathematics Course Taking and Gains in Mathematics Achievement*, June 1995, Publication number NCES 95-714).

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Table 1.— National average proficiency of public and private school eighth-grade students by mathematics course-taking, and by race and gender: 1992

	Algebra		Pre-Algebra		Eighth-Grade Mathematics		Other Mathematics	
	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency
Nation	20	299	28	272	49	255	3	249
Race/Ethnicity								
White	22	306	30	278	45	265	3	258
Black	13	258	23	246	60	230	4	232
Hispanic	12	277	20	256	62	240	5	231
Asian/Pacific Islander	42	313	24	278	32	264	2	277
Community Type								
Advan. Urban[1]	33	314	27	286	36	270	3	262
Disadvan. Urban[2]	15	267	14	251	67	230	3	246
Extreme Rural[3]	10	298	38	267	50	264	3	240
Other[4]	20	298	29	272	48	256	4	249
Type of School								
Public	19	299	28	271	50	253	4	248
Non-Public	25	301	33	278	40	270	2	266
Gender								
Male	19	299	28	272	49	255	4	249
Female	20	300	28	272	48	254	3	250

Source: U.S. Department of Education; National Center for Education Statistics, NAEP 1992 Mathematics Report Card for the Nation and the States.

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[1] **Advantaged Urban** represents about 10 percent of the students attending schools in suburban and urban communities where students' parents had professional or managerial jobs.

[2] **Disadvantaged Urban** represents about 10 percent of the students attending schools in suburban and urban communities where high proportions of the parents were on welfare or not regularly employed.

[3] **Extreme Rural** includes the approximately 10 percent of students attending schools in the most rural areas, where many of the parents were farmers or farm workers.

[4] **Other** category includes the 70 percent of students not falling into one of the above *extreme* categories.

Table 2.— Average proficiency of eighth-grade public school students by mathematics course-taking, and by state: 1992

Public Schools	Algebra		Pre-Algebra		Eighth-Grade Mathematics		Other Mathematics	
	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency	Percent of Students	Average Proficiency
NATION	19	299	28	271	50	253	3	248
Northeast	26	296	22	272	47	252	4	***
Southeast	16	292	31	265	50	246	3	***
Central	17	305	27	275	53	263	3	***
West	18	302	29	273	49	253	3	***
STATES								
Alabama	15	283	18	264	63	241	4	235
Arizona	20	289	31	269	44	252	5	248
Arkansas	15	290	19	265	64	246	2	***
California	21	290	21	271	53	247	4	234
Colorado	21	297	36	269	38	261	4	265
Connecticut	20	305	31	280	46	257	3	255
Delaware	23	294	34	264	41	244	2	***
Dist. Columbia	35	251	19	236	42	219	3	***
Florida	23	290	25	267	49	242	4	234
Georgia	18	291	31	265	49	244	2	***
Hawaii	12	297	27	273	55	244	6	223
Idaho	18	303	41	275	36	263	5	247
Indiana	16	306	15	282	67	258	2	***
Iowa	14	313	24	287	60	275	2	***
Kentucky	16	295	22	270	60	251	3	241
Louisiana	12	273	61	247	26	243	1	***
Maine	18	306	28	281	51	268	3	***
Maryland	32	288	31	261	33	243	4	277
Massachusetts	26	298	33	276	38	254	3	252
Michigan	19	293	23	274	55	255	3	261
Minnesota	23	307	33	279	42	270	3	281
Mississippi	13	282	19	259	67	235	2	***
Missouri	13	305	26	278	59	261	2	238
Nebraska	17	303	25	272	55	272	3	262
New Hampshire	18	307	35	279	45	266	2	***
New Jersey	19	304	23	278	54	258	3	261
New Mexico	13	287	25	267	58	250	4	249
New York	13	295	9	282	70	258	8	280
North Carolina	22	291	30	261	45	241	3	231
North Dakota	12	309	30	283	57	278	2	***
Ohio	13	304	24	277	61	256	1	***
Oklahoma	16	296	36	272	45	256	3	***
Pennsylvania	27	296	27	271	42	256	3	239
Rhode Island	21	295	31	268	45	250	2	***
South Carolina	17	301	17	272	63	248	3	235
Tennessee	11	290	14	271	73	252	3	***
Texas	17	302	18	273	62	252	2	***
Utah	32	296	38	270	25	251	5	275
Virginia	19	303	41	269	38	248	2	***
West Virginia	21	288	27	264	50	244	2	***
Wisconsin	14	304	20	284	63	271	3	253
Wyoming	18	301	33	273	44	266	4	253
TERRITORIES								
Guam	11	270	22	258	64	222	3	***
Virgin Islands	6	249	14	231	78	219	2	***

Source: U.S. Department of Education; National Center for Education Statistics, NAEP 1992 Mathematics Report Card for the Nation and the States.
-***Sample size insufficient to permit reliable estimate
-The percentages may not add to 100 percent because a small number of students reported not taking a mathematics course

Table 2 shows the 1992 NAEP mathematics results for the forty-two states, two territories, and the District of Columbia that volunteered to participate in the assessment. In comparing states, be aware that there are many factors that contribute to state scores and these factors vary from state to state.

NOTE:

NAEPFACTS is a new series that briefly summarizes findings from the National Assessment of Educational Progress (NAEP). The series is a product of the National Center for Education Statistics (NCES). This issue was written by **Sharif Shakrani**. To order other NAEP publications, call Bob Clemons at 301–763–1968.

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